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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/736,790	12/14/2000	Tomas Nordstrom	S1022/8495	6611
7590	09/14/2004			
James H. Morris Wolf, Greenfield & Sacks, P.C. Federal Reserve Plaza 600 Atlantic Avenue Boston, MA 02210-2211			EXAMINER BAYARD, EMMANUEL	
			ART UNIT 2631	PAPER NUMBER
DATE MAILED: 09/14/2004				

Please find below and/or attached an Office communication concerning this application or proceeding.

AK

Office Action Summary

Application No.

09/736,790

Applicant(s)

NORDSTROM ET AL.

Examiner

Emmanuel Bayard

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 July 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-27 and 29-34 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☐ Claim(s) 1-27 and 29-34 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

This is in response to amendment filed on 7/20/04 in which claims 1-27 and 29-33 are pending and claim 28 is canceled. The applicant's amendments have been fully considered but they are moot based on the new ground of rejection.

1.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-2, 7-8, 11-14, 19-20, 23-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cherubini et al U.S. patent No 6,665,349 B1 in view of Dowling U.S. Patent No 6,597,745 B1.

As per claims 1 and 12 Cherubini et al discloses a far-end cross talk canceling circuit for a digital subscriber line transmission system, said transmission system comprising a plurality of transceivers is the same as the claimed (plurality of line termination modems) transmitting discrete multitone symbols to corresponding network termination transceivers (modems) over a plurality of transmission channels (see abstract and figs. 9-11 elements 43, 45 and col.12, lines 25-35).

However Cherubini et al does not teach a FEXT (far-end cross talk) comprising pre-compensation means multiplying, before transmission, a vector $S = (S_i)$, $i = 1$ to n , by a pre-compensation matrix such that the matrix product $H \cdot M$ is diagonal, H being a

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transfer matrix of the plurality of transmission channels defined by $R = H*S$, where $R = (R_i)$, $i = 1$ to n , is the vector of the digital transmission symbols R_i respectively received by the modems.

Dowling teaches a precoder compensation is functionally equivalent to the claimed (pre-compensation means multiplying) (see col.1, lines 10-12 and col.2, lines 47-55 and col.7, lines 8-25), before transmission, a vector $S = (S_i)$, $i = 1$ to n , by a DFFT is functionally equivalent to the claimed (pre-compensation matrix such that the matrix product $H*M$ is diagonal) (see abstract and figs.2, 4-5, 7 elements 230, 410, 550, 720 and col.7, lines 54-67 and col.9, lines 15-67 and col.10, lines 44-67 and col.11, lines 10-50 and col.14, lines 20-67 and col.15, lines 1-67), H being a transfer matrix of the plurality of transmission channels defined by $R = H*S$, where $R = (R_i)$, $i = 1$ to n , is the vector of the digital transmission symbols R_i respectively received .

It would have been obvious to one of ordinary skill in the art to implement the teaching Dowling into Cherubini as for the receiver to accurately estimate the channel impulse response and recover the original data sequence from a received sequence channel of inter-block interference as taught by Dowling (see col.6, lines 50-55 and col.8, lines 60-65).

As per claim 2, Dowling does teach a storing means (see col.11, lines 20-32 and col.15, lines 25-40) and inversion for inverting said transfer matrix and providing the pre-compensation means with the inverted matrix (see col.7, lines 53-67). Furthermore implement such teaching into Cherubini for storing would have been obvious to one skilled in the art as to accurately retrieve vector coefficients free and subsequently canceling cross-talk in the vector.

As per claim 3, Dowling and Cherubini in combination teach all the features of the claimed invention as to accurately retrieve vector coefficients free and subsequently canceling cross-talk in the vector (see claims 1 and 2 rejection above).

As per claims 4-5, 16, 17 and 26 Dowling and Cherubini in combination teach all the features of the claimed invention (see claims 1-4 rejection above). In addition Dowling teaches a reduction modulo is functionally equivalent to the claimed (cancellation circuit) for canceling crosstalk (see fig.5 element 510). Furthermore implementing such teaching at the line termination for estimating the inverse of the transfer matrix would have been obvious to one of ordinary skill in the art as for the receiver to accurately estimate the channel impulse response and recover the original data sequence from a received sequence channel of inter-block interference as taught by Dowling (see col.6, lines 50-55 and col.8, lines 60-65).

As per claims 6 and 22 Cherubini and Dowling in combination would include means for inserting, detecting at predetermined times known symbols, a multiplexer and demultiplexer as for the receiver to accurately estimate the channel impulse response and recover the original data sequence from a received sequence channel of inter-block interference

As per claims 7, 19, 23, Cherubini et al far-end cross-talk canceling method for a digital subscriber line transmission system, said transmission system comprising a plurality of transceivers is the same as the claimed (plurality of line termination modems) transmitting discrete multitone symbols to corresponding network termination transceivers (modems) over a plurality of transmission channels (see abstract and figs. 9-11 elements 43, 45 and col.12, lines 25-35).

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However Cherubini et al does not teaches a FEXT (far-end cross talk) comprising pre-compensation means multiplying, before transmission, a vector $S = (S_i)$, $i = 1$ to n , by a pre-compensation matrix such that the matrix product $H*M$ is diagonal, H being a transfer matrix of the plurality of transmission channels defined by $R = H*S$, where $R = (R_i)$, $i = 1$ to n , is the vector of the digital transmission symbols R_i respectively received by the modems.

It would have been obvious to one of ordinary skill in the art to implement the teaching Dowling into Cherubini as for the receiver to accurately estimate the channel impulse response and recover the original data sequence from a received sequence channel of inter-block interference as taught by Dowling (see col.6, lines 50-55 and col.8, lines 60-65)

As per claims 8, 13, 24 Dowling does teach a storing means (see col.11, lines 20-32 and col.15, lines 25-40) and inversion for inverting said transfer matrix and providing the pre-compensation means with the inverted matrix (see col.7, lines 53-67). Furthermore implement such teaching into Cherubini for storing would have been obvious to one skilled in the art as to accurately retrieve vector coefficients free and subsequently canceling crosstalk in the vector.

As per claim 9, Dowling and Cherubini in combination teach all the features of the claimed invention (see claims 1-4 rejection above).

As per claim 10, Cherubini and Dowling in combination would include step for inserted, detected at predetermined times known symbols as for the receiver to accurately estimate the channel impulse response and recover the original data sequence from a received sequence channel of inter-block interference

As per claims 11, 14, 25, 29 Cherubini et al far-end cross-talk canceling method for a digital subscriber line transmission system, said transmission system comprising a plurality of transceivers is the same as the claimed (plurality of line termination modems) transmitting discrete multi-tone symbols to corresponding network termination transceivers (modems) over a plurality of transmission channels (see abstract and figs. 9-11 elements 43, 45 and col.12, lines 25-35).

As per claim 20, Dowling teaches an inversion means (see col.7, lines 53-67). Furthermore implementing such inversion for inverting said transfer matrix and providing the pre-compensation means with the inverted matrix would have been obvious to one skilled in the art as to accurately plot the transfer function matrix.

As per claim 21, Dowling and Cherubini in combination teach all the features of the claimed invention (see claims 1-4 rejection above).

As per claim 27, Cherubini and Dowling in combination would teach a FEXT for performing frequent-time signal transformation as to accurately plot the transfer function matrix.

As per claim 30, Dowling teaches an inversion means (see col.7, lines 53-67). Furthermore implementing such inversion into Cherubini for inverting said transfer matrix and providing the pre-compensation means with the inverted matrix would have been obvious to one skilled in the art as to accurately plot the transfer function matrix.

As per claim 31, Dowling does teach a storing means (see col.11, lines 20-32 and col.15, lines 25-40) and inversion for inverting said transfer matrix and providing the pre-compensation means with the inverted matrix (see col.7, lines 53-67). Furthermore

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implement such teaching into Cherubini for storing would have been obvious to one skilled in the art as to accurately retrieve vector coefficients free and subsequently canceling crosstalk in the vector.

Conclusion

3. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Raleigh et al U.S. Patent No 6,452,981B1 teaches financial products a spatio-temporal processing for interference handling.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Emmanuel Bayard whose telephone number is 571 272 3016. The examiner can normally be reached on Monday-Friday (7:Am-4:30PM) Alternate Friday off.

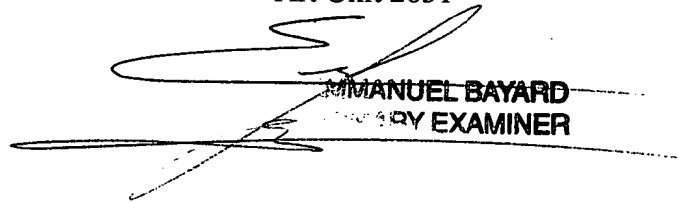
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammed Ghayour can be reached on 571 272 3021. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Emmanuel Bayard
Primary Examiner
Art Unit 2631

9/9/04



EMMANUEL BAYARD
PRIMARY EXAMINER